(3) broadcasting a response to the request including transmitting control data in the first part of a frame; and

at the second node,

(1) receiving the control data transmitted by the first node,

(2) determining the portion of the second part of each of the frames that is allocated to said dynamically allocated channel, and

(3) sending a data stream over said dynamically allocated channel to the third node, including passing data in said portion of the second part of each of a series of frames.

19. The method of claim 18 wherein receiving the request for the dynamically allocated channel between the second node and the third node includes receiving a request to change an allocated capacity of a communication channel.

A1 Cont.

20. The method of claim 18 wherein receiving the request to assign the communication session includes receiving a priority for said communication session.

21. The method of claim 19 wherein allocating the portion of the second part of the frames to said communication channel includes modifying allocated capacities of multiple communication channels.

22. The method of claim 18 wherein the communication system includes a synchronous communication network and each frame includes a fixed length payload, and wherein allocating the fixed part of each frame includes allocating a portion of the fixed length payload of each frame.

23. The method of claim 22 wherein the synchronous communication network includes a SONET/SDH network, and a Synchronous Payload Envelope (SPE) of each frame comprises the fixed length payload.

24. The method of claim 23 wherein the portion of the fixed length payload comprises the entire SPE.

25. The method of claim 23 wherein the portion of the fixed length payload includes a virtual tributary group.

26. The method of claim 23 wherein provisioning the communication system further includes allocating a portion of the SPE to conventional SONET/SDH virtual tributaries, whereby a portion of the communication capacity of the SONET/SDH network is used for conventional communication on statically allocated virtual paths.

27. The method of claim 23 wherein the portion of the SPE includes a virtual tributary.

28. The method of claim 18 wherein the first part of each frame is for passing control information that includes requests for dynamically allocated channels from a plurality nodes of the system.

29. The method of claim 18 wherein the control data that is broadcast in the first part of each frame is for passing data specifying portions of each frame associated with each of a plurality of dynamically allocation channels.

30. The method of claim 29 wherein data specifying portions of each frame includes offset data of said portions within the frame.

31. The method of claim 30 wherein data specifying portions of each frame includes sizes of the data of said portions within the frame.

32. The method of claim 29 wherein sending the data stream over the dynamically allocated channel from the second node to the third node includes accessing the data specifying the portion of the frame associated with said dynamic channel.

33. The method of claim 32 wherein sending the data stream includes adding data to the frame according to the accessed data specifying the portion of the frame associated with the dynamic channel.

34. The method of claim 18 wherein receiving the request for the dynamically allocated channel between the second node and the third node includes receiving a request to assign a communication session for passing a data stream between the second node and the third node.

A1 Cont.

35. The method of claim 34 further comprising receiving the request for altering the capacity of a dynamically allocated channel between the second node and the third node, said request being sent from the second node and received at the third node.

36. The method of claim 35 further comprising, at the third node, modifying the request and forwarding the modified request to the first node.

37. The method of claim 36 wherein modifying the request is performed according to communication capacity required for communication from the third node to the second node.

38. The method of claim 18 wherein the fixed part includes a third part that is allocated for fixed-rate channels between the nodes.

39. The method of claim 38 wherein the location of the third part in the fixed part remains constant independent of locations of dynamically allocated channels.

40. The method of claim 38 wherein the third part includes a plurality of separated portions within the fixed part.

41. The method of claim 18 wherein the first part of the frame and the second part of the frame are each integral numbers of columns of an SPE.

42. The method of claim 41 wherein allocating a portion of the second part of the frames includes allocating an integral number of nine-byte columns of an SPE.

43. A method for passing data between nodes of a synchronous communication network comprising:

provisioning the network, including identifying a fixed portion of synchronous frames transmitted over the network for passing the data between the nodes, said fixed portion including a first part of the frame for passing control information between the nodes and a second part for passing data streams over dynamically allocated channels between the nodes;

establishing a plurality of communication channels for passing data between the nodes and associating each communication channel with a plurality of terminal source or destination nodes, wherein the plurality of communication channels includes a first communication channel coupling a second node to a third node;

at a first node, determining an allocation of a portion of the second part of the frames for each of the communication channels;

broadcasting the allocation from the first node to the other nodes including passing information in the first part of one or more frames;

at each of the second and the third nodes, receiving control information in the first part of a sequence of frames and processing the received control information to determine the portion of a frame that is allocated to the first communication channel;

at the second node, receiving a first frame from the network, adding data for transmission to the third node into the portion of the first frame that is allocated to the first communication channel; and transmitting the first frame onto the network; and

at the third node, receiving the first frame from the network, and extracting the data from the portion of the first frame that is allocated to the first communication channel.

44. The method of claim 43 wherein the synchronous communication network comprises a SONET/SDH network.

45. The method of claim 43 wherein the first part is for passing requests for adjusting the allocations of the frame for the communication channels.

Cont.

46. The method of claim 43 further comprising:

sending a request from the second node to the first node to change the allocated capacity of the first communication channel; and

at the first node, receiving the request, determining an update to the allocation of the second part of the frames for the communication channels, and broadcasting control information to the other nodes encoding the update to the allocation.

47. A communication system comprising a plurality of nodes coupled by a communication path, wherein one of the nodes is an arbiter node, and wherein each node includes:

a framer for receiving a series of communication frames from the communication path, and for transmitting the communication frames along the communication path;

circuitry for identifying control information in each of the communication frames;

circuitry for determining an allocated location and a size of a portion of each communication frame that is allocated to a selected one of the traffic streams using the identified control information; and

circuitry for inserting data for the selected traffic stream into the communication frame at the determined location for the selected stream.

A1 cont.

48. The communication system of claim 47 further comprising:

circuitry for inserting a request to change the allocated size for the traffic stream in the communication frame prior to its transmission.